Triangle Trig and Angle Relationships Review  Name: Key

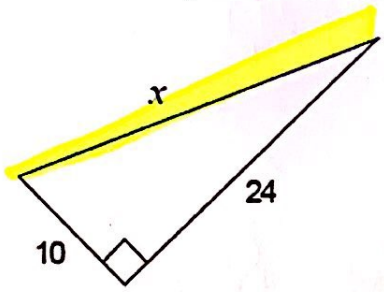
**Section One:**

Solving for a missing side of a right triangle when given two other sides of the triangle!

We use Pythagorean Theorem, $a^2+b^2=c^2$

c → hypotenuse!

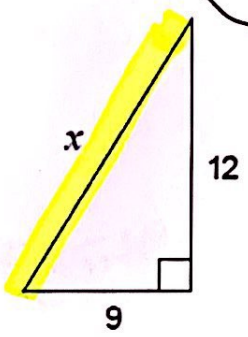
1.




$x^2 = 10^2 + 24^2$

$x = 26$

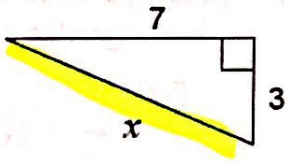
2.




$x^2 = 12^2 + 9^2$

$x = 15$

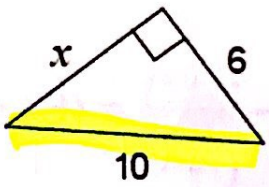
3.




$x^2 = 7^2 + 3^2$

$x = 7.62$

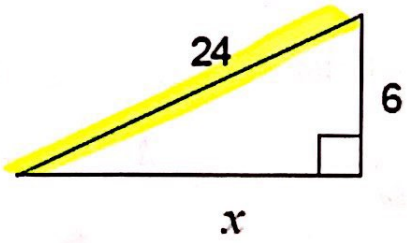
4.




$10^2 = 6^2 + x^2$

$x = 8$

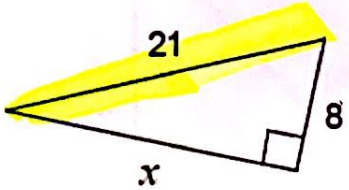
5.




$24^2 = x^2 + 6^2$

$x = 23.24$

6.



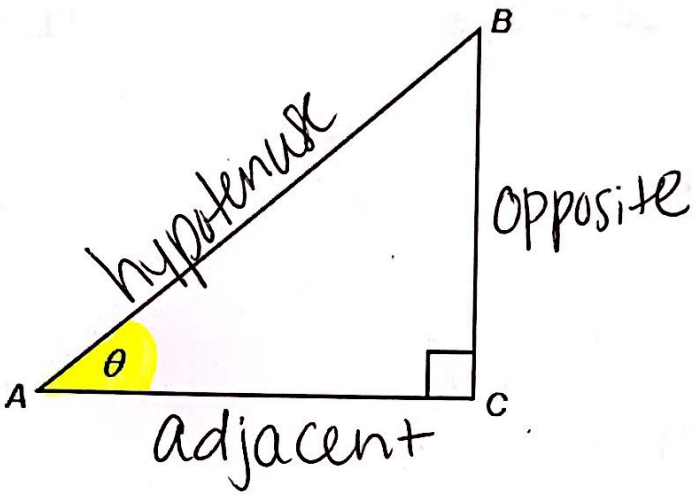

$21^2 = x^2 + 8^2$

$x = 19.42$

**Section Two:**

When working with right triangles, we can use trig ratio to help us solve for sides and angles! Let's make sure we are familiar with our ratios!

Label the sides of the right triangle as opposite, adjacent, and hypotenuse.




SOH
CAH
TOA

We have three trig ratios! Write the ratios below. (It is important that we know them when it comes to solving!

$sin\ (\Theta) = \frac{opp}{hyp}$ $cos\ (\Theta) = \frac{adj}{hyp}$ $tan\ (\Theta) = \frac{opp}{adj}$

Let's practice setting up our ratios! Use the triangle below to write each trig ratio!

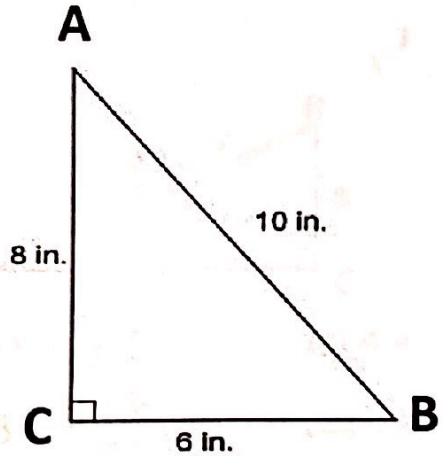
sin A = 6/10 sin B = 8/10

cos A = 8/10 cos B = 6/10

tan A = 6/8 tan B = 8/6

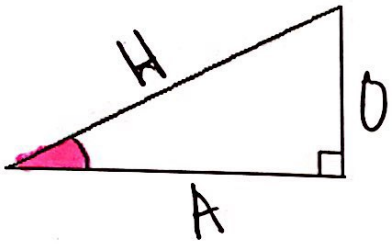
m∠A = 36.87° m∠B = 53.13°

Inverse Trig!

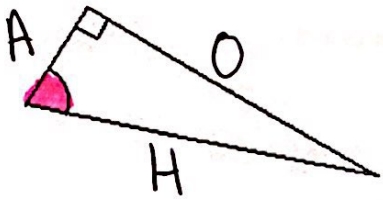


Practice! Label each of the sides as opposite leg, adjacent leg, and hypotenuse.

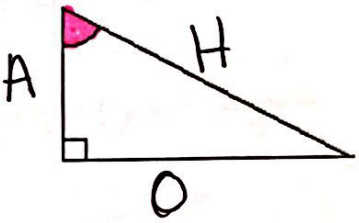
**1.**



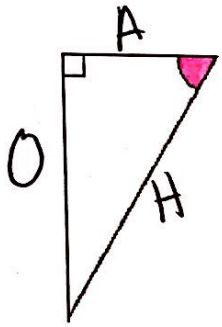

**2.**



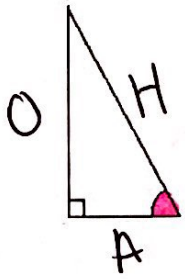

**3.**



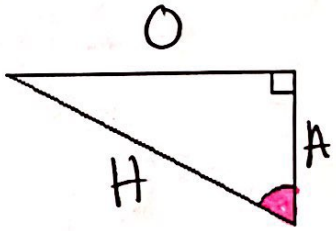

**4.**



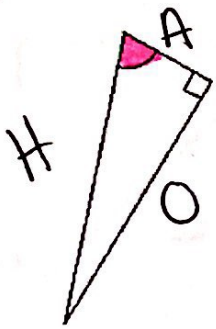

**5.**



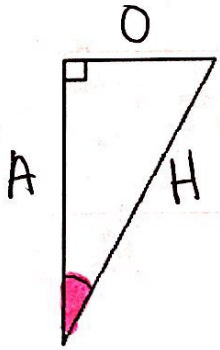

**6.**



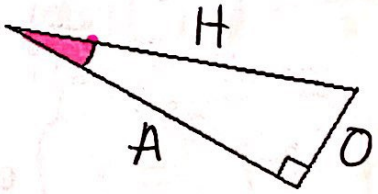

**7.**




**8.**

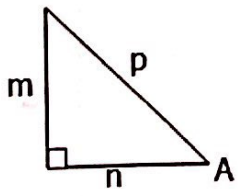



**9.**




$x^2 = 15^2 + 8^2$

**10.**

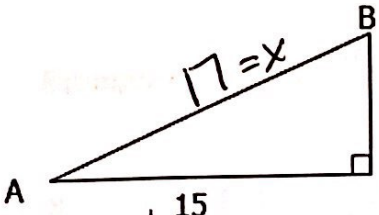



$\sin A = \frac{m}{p}$

$\cos A = \frac{n}{p}$

$\tan A = \frac{m}{n}$

**11.**




$\sin B = \frac{15}{17}$

$\cos B = \frac{8}{17}$

$\tan B = \frac{15}{8}$

$\sin A = \frac{8}{17}$

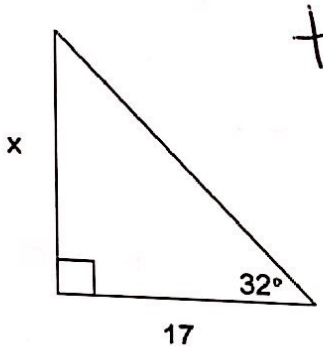
$\cos A = \frac{15}{17}$

$\tan A = \frac{8}{15}$

**Section Three:**

Now, let's use our trig ratio to help us solve for sides and angles! Remember that when solving for angles we need to use Inverse Trig ! We can get this by hitting 2nd →
Chosen Trig Function!

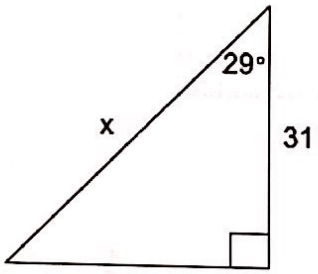
*Example 1:*




$\tan(32) = \frac{x}{17}$

$x = 10.62$

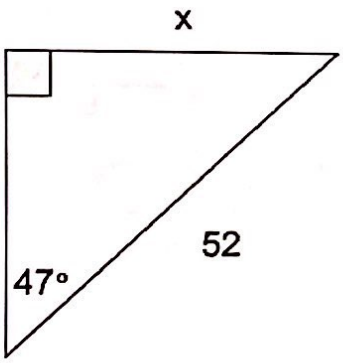
*Example 2:*




$\cos(29) = \frac{31}{x}$

$x = 35.44$

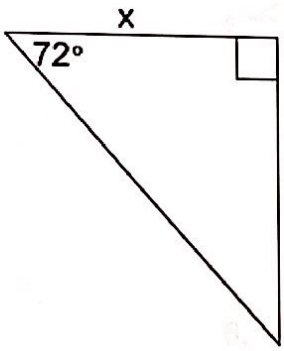
*Example 3:*




$\sin(47) = \frac{x}{52}$

$x = 38.03$

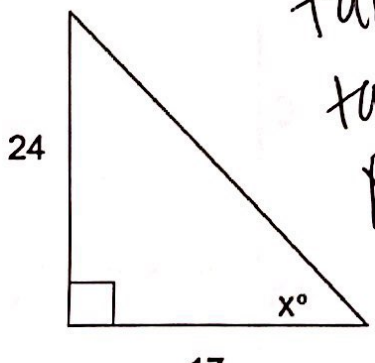
*Example 4:*




$\tan(72) = \frac{19}{x}$

$x = 6.17$

*Example 5:*

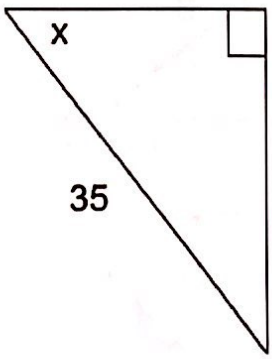



$\tan(x) = \frac{24}{17}$

$\tan^{-1}\left(\frac{24}{17}\right) = x$

$x = 54.69$

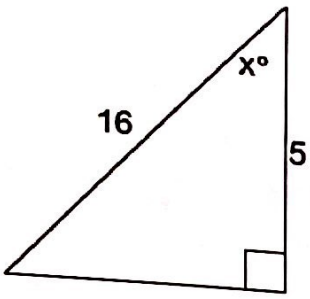
*Example 6:*




$\sin^{-1}\left(\frac{14}{35}\right) = x$

$x = 23.58$

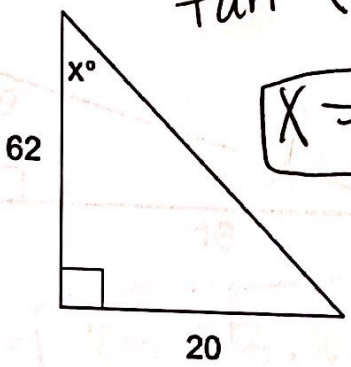
*Example 7:*




$\cos^{-1}\left(\frac{5}{16}\right) = X$

$X = 71.79$

*Example 8:*

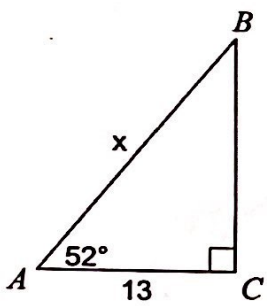



$\tan^{-1}\left(\frac{20}{62}\right) = X$

$X = 17.88$

*Practice:*

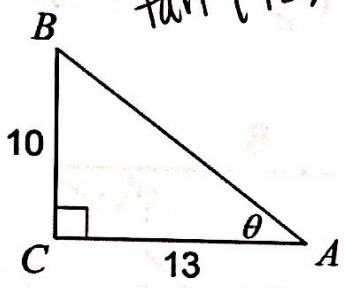
1.




$\cos(52) = \frac{13}{X}$

$X = 21.12$

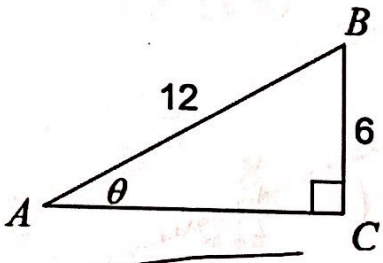
2.




$\tan^{-1}\left(\frac{10}{13}\right) = X$

$\theta = 37.57$

3. $\sin^{-1}\left(\frac{6}{12}\right) = X$

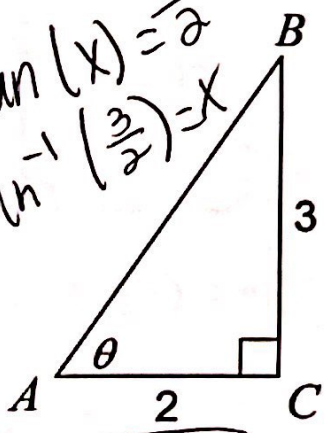



$X = 30$

4.

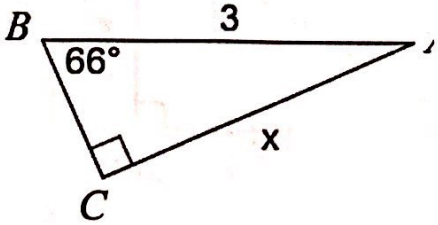
$\tan(X) = \frac{3}{2}$

$\tan^{-1}\left(\frac{3}{2}\right) = X$



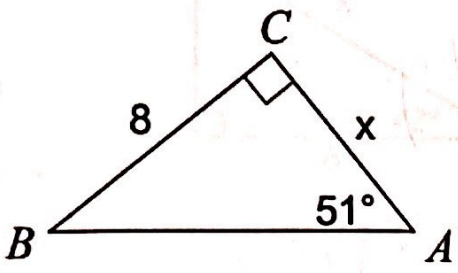

$X = 56.31$

5. $\sin(66) = \frac{X}{3}$



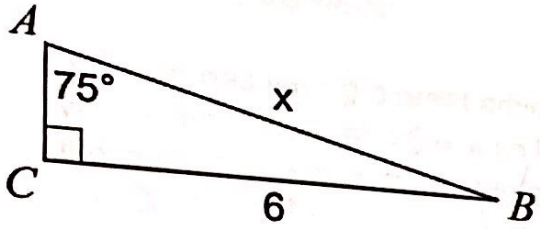

$X = 2.74$

6. $\tan(51) = \frac{8}{X}$



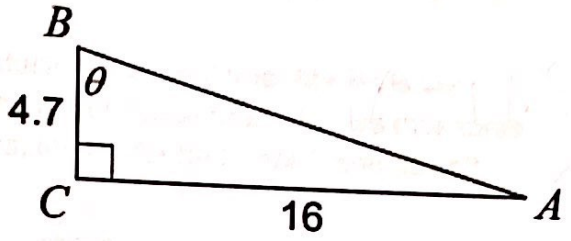

$X = 6.48$

7. $\sin(75) = \frac{6}{x}$



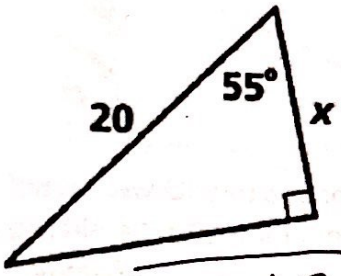

$x = 6.21$

8. $\tan^{-1}\left(\frac{16}{4.7}\right) = x$



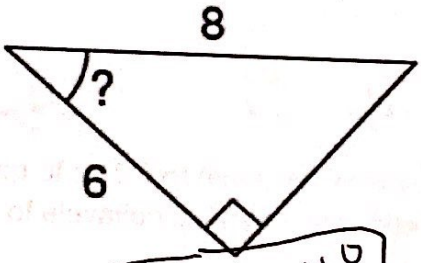

$x = 73.63°$

9. $\cos(55) = \frac{x}{20}$



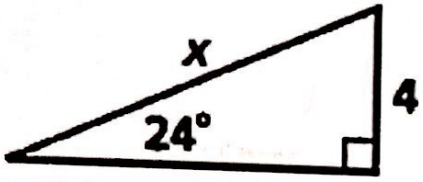

$x = 11.47$

10. $\cos^{-1}\left(\frac{6}{8}\right) = x$



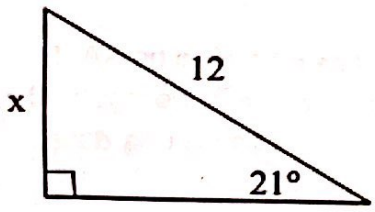

$x = 41.41°$

11. $\sin(24) = \frac{4}{x}$




$x = 9.83$

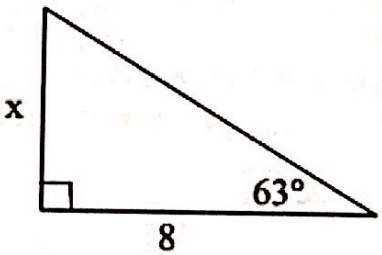
12.




$\sin(21) = \frac{x}{12}$

$x = 4.30$

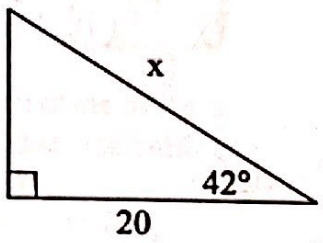
13.




$\tan(63) = \frac{x}{8}$

$x = 15.70$

14.



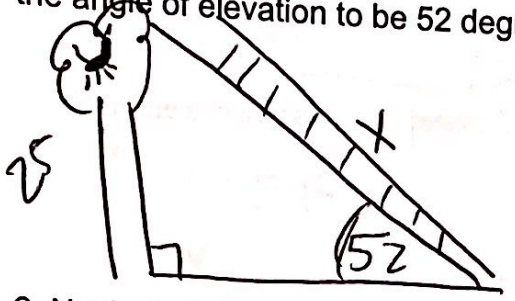

$\cos(42) = \frac{20}{x}$

$x = 26.91$

**Section Four:**

We can also use trig to solve word problems! Make sure you draw a picture to help you make sense of the problems!

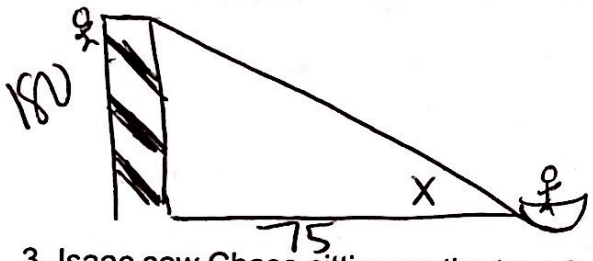
1. Tyson was having a great adventure when he got stuck in a 25 foot tree! Matias is very worried and props an adjustable ladder against the tree to get Tyson down. Matias measures the angle of elevation to be 52 degrees. How long must the ladder be to get Tyson down?




$\sin(52) = \frac{25}{X}$

$X = 31.73$ ft

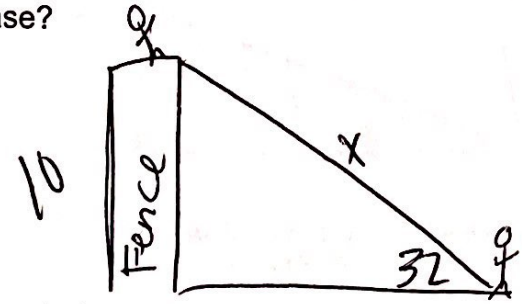
2. Nachelle is in a boat 75 feet away from the lighthouse that Katherine is operating. If Katherine is at the top of the lighthouse which is 180 feet tall, what is the angle of elevation that Nachelle must look to see the Katherine?




$\tan^{-1}\left(\frac{180}{75}\right) = X$

$X = 67.38°$

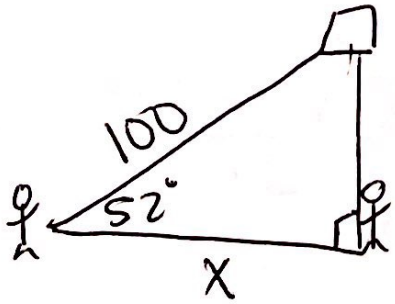
3. Isaac saw Chase sitting on the top of a 10 foot fence. Isaac wants to throw a rock at Chase to get his attention. If Isaac's angle of elevation is 32 degrees, how far must the rock travel to hit Chase?




$\sin(32) = \frac{10}{X}$

$X = 18.87$ ft

4. Aaron is flying a kite and lets out 100 feet of string. The angle of elevation of the string is 52 degrees. The kite is now about Jacobs head in the distance. What is the distance between Jacob and Aaron?

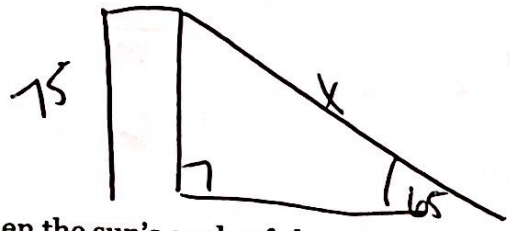



$\cos(52) = \frac{X}{100}$

$X = 61.57$ feet

Practice:

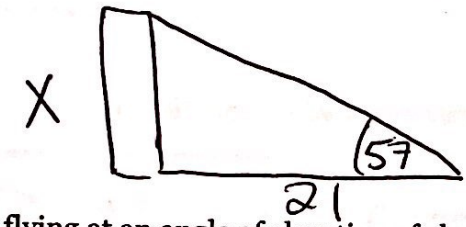
1. A wire is attached to the top of a 75 foot tower and meets the ground at a 65° angle. How long is the wire?




$\sin(65) = \frac{75}{x}$

$x = 82.75$ ft

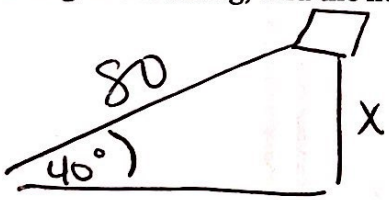
2. When the sun's angle of elevation is 57°, a building casts a shadow 21 meters long. How high is the building?




$\tan(57) = \frac{x}{21}$

$x = 32.34$ m

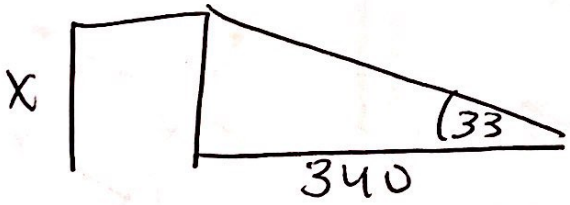
3. A kite is flying at an angle of elevation of about 40°. All 80 meters of string have been let out. Ignoring the sag in the string, find the height of the kite.




$\sin(40) = \frac{x}{80}$

$x = 51.42$ m

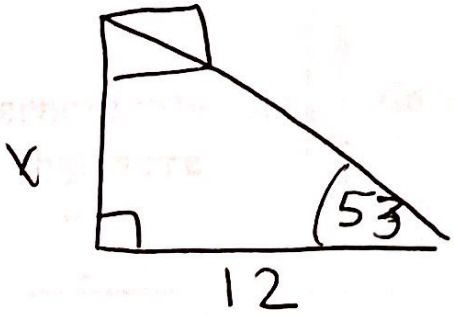
4. From a point 340 meters from the base of the Hoover Dam, the angle of elevation to the top of the dam is 33°. Find the height of the dam to the nearest meter.




$\tan(33) = \frac{x}{340}$

$x = 220.80$ m

5. From a point on the ground 12 ft from the base of a flagpole, the angle of elevation of the top of the pole measures 53°. How tall is the flagpole?



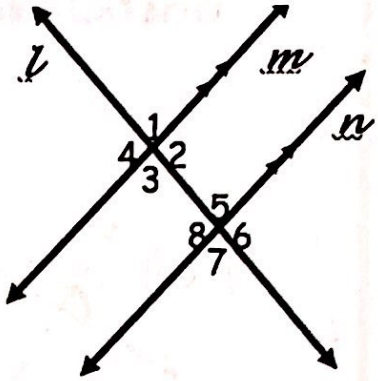

$\tan(53) = \frac{x}{12}$

$x = 15.92$ ft

allel Lines Cut by a Transversal

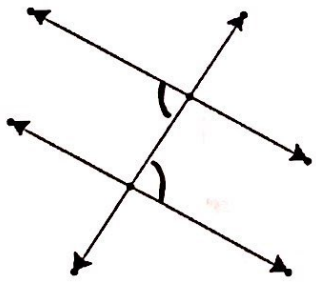
Name: _____

| Name | Definition |
|---|---|
| Transversal | a line cutting two parallel lines |
| Interior Angles | Inside the parallel lines |
| Exterior Angles | Outside parallel lines |
| Adjacent Angles | angles next to each other |




Parallel Lines cut by a transversal – Fill in each box with examples of each term!!

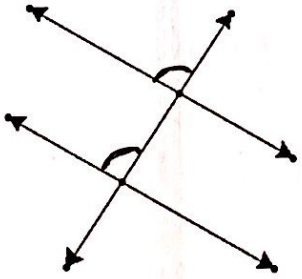
**Alternate Interior**



Alternate interior angles are $\cong$.

Examples: ∠3 & ∠5
∠2 & ∠8

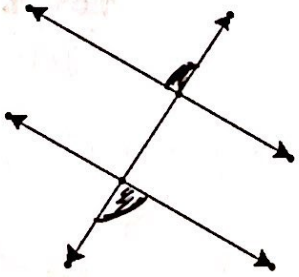
**Corresponding Angles**



Corresponding angles are $\cong$.

Examples: ∠4 & ∠8
∠3 & ∠7
∠1 & ∠5
∠2 & ∠6

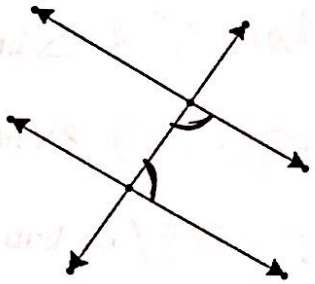
**Alternate Exterior**



Alternate exterior angles are $\cong$.

Examples: ∠4 & ∠6
∠7 & ∠1

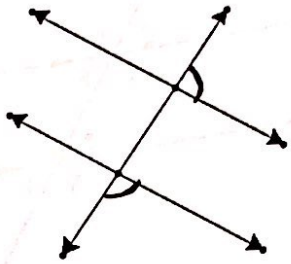
## Same Side Interior or Consecutive Interior



Same side interior or consecutive interior angles are $=180$.

Examples: $\angle 3$ & $\angle 8$
$\angle 2$ & $\angle 5$

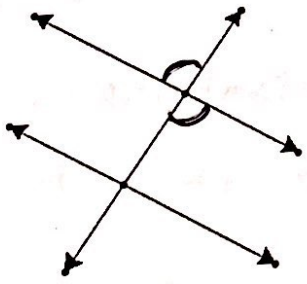
## Same Side Exterior or Consecutive Exterior



Same side exterior or consecutive exterior angles are $=180$.

Examples: $\angle 4$ & $\angle 7$
$\angle 1$ & $\angle 6$

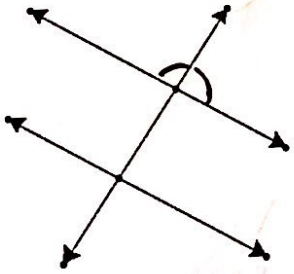
## Vertical Pair



Vertical angles are $\cong$.

Examples: $\angle 1$ & $\angle 3$ $\quad$ $\angle 4$ & $\angle 2$
$\angle 5$ & $\angle 7$ $\quad$ $\angle 8$ & $\angle 6$

## Linear Pair



Linear pair angles are $=180$.

Examples: $\angle 1$ & $\angle 4$ $\quad$ $\angle 5$ & $\angle 6$
$\angle 1$ & $\angle 2$ $\quad$ $\angle 5$ & $\angle 8$
$\angle 3$ & $\angle 4$ $\quad$ $\angle 7$ & $\angle 8$
$\angle 3$ & $\angle 2$ $\quad$ $\angle 6$ & $\angle 7$

Practice:

1. Name the type of each given angle pair.

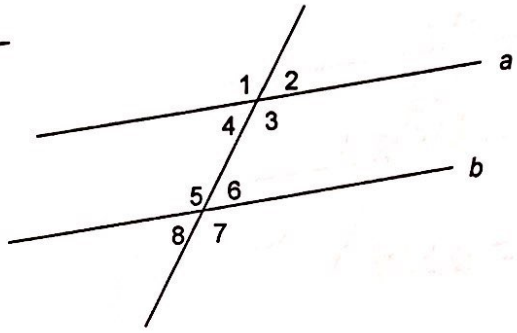
a. $\angle 3$ and $\angle 5$ Alternate Interior

b. $\angle 1$ and $\angle 7$ Alternate Exterior

c. $\angle 4$ and $\angle 8$ Corresponding

d. d. $\angle 8$ and $\angle 6$ Vertical Angles

e. $\angle 4$ and $\angle 3$ Linear Pair




2. Given: $a \| b$ and $m\angle 5 = 132°$. Find the measure of each of the remaining angles.

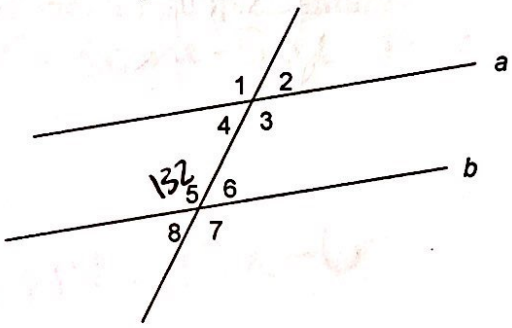
180-132 = 48

$m\angle 1 =$ 132, $m\angle 2 =$ 48,

$m\angle 3 =$ 132, $m\angle 4 =$ 48,

$m\angle 6 =$ 48, $m\angle 7 =$ 132,

$m\angle 8 =$ 48



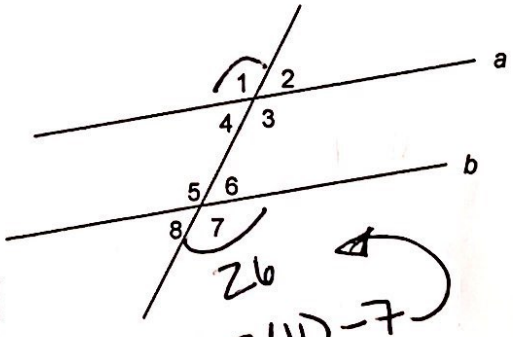

3. If $m\angle 1 = (2x + 4)°$ and $m\angle 7 = (3x - 7)°$, find $m\angle 6$.

$2x+4 = 3x-7$

$X = 11$

$m\angle 6 = 154$

$180 - 26 = 154$



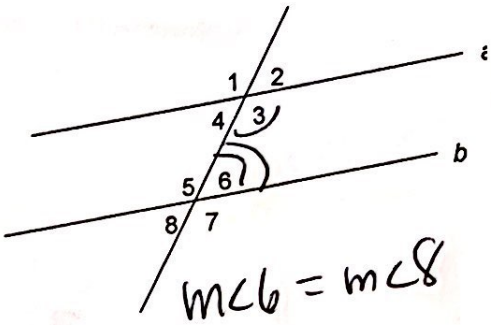
4. If $m\angle 3 = (2x + 24)°$ and $m\angle 6 = (6x + 20)°$, find $m\angle 8$.

$2x+24+6x+20=180$

$8x+44=180$

$x=17$

$m\angle 8 = 122$




$m\angle 6 = m\angle 8$

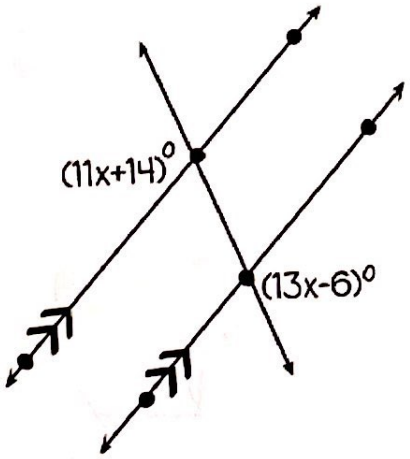
5. What angle pairs created by a transversal and parallel lines are congruent?

Corresponding, Vertical angles, Alternate Interior, Alternate Exterior

6. What angle pairs created by a transversal and parallel lines are supplementary?

Linear Pair, Same-Side Interior, Same-Side Exterior

7. Solve for x:




$11x+14=13x-6$

$20=2x$

$x=10$